



**[Billing Code 4140-01-P]**

**DEPARTMENT OF HEALTH AND HUMAN SERVICES**

**National Institutes of Health**

**Government-Owned Inventions; Availability for Licensing**

**AGENCY:** National Institutes of Health, HHS.

**ACTION:** Notice.

**SUMMARY:** The inventions listed below are owned by an agency of the U.S.

Government and are available for licensing in the U.S. in accordance with 35 U.S.C. 209 and 37 CFR part 404 to achieve expeditious commercialization of results of federally-funded research and development. Foreign patent applications are filed on selected inventions to extend market coverage for companies and may also be available for licensing.

**FOR FURTHER INFORMATION:** Licensing information and copies of the U.S. patent applications listed below may be obtained by writing to the indicated licensing contact at the Office of Technology Transfer, National Institutes of Health, 6011 Executive Boulevard, Suite 325, Rockville, Maryland 20852-3804; telephone: 301-496-7057; fax: 301-402-0220. A signed Confidential Disclosure Agreement will be required to receive copies of the patent applications.

## **Rabies Vaccine for the Oral Immunization of Domesticated Animals, Wildlife and Feral Animals**

**Description of Technology:** This invention, developed by the CDC and collaborators, entails a live, attenuated recombinant rabies virus vaccine that can elicit an effective anti-rabies immune response in animal recipients. Inoculation with a live, attenuated, rabies virus allows for the optimized production of immunity in the absence of pathogenicity. Oral administration of rabies vaccines is often a preferred route of vaccine delivery because it is most effective in wildlife. Unfortunately, availability of an oral vaccine for canines has been a significant hurdle to date.

This vaccine technology could be used for immunization of stray dogs by an oral route. In developing nations, more than 90% of human exposure events and 99% of human deaths due to rabies are caused by rabid dogs. Using this vaccine with a broadly implemented oral vaccination strategy provides a promising opportunity for reducing transmission of rabies between stray dogs and, thereby, increasing protection for people.

### **Potential Commercial Applications:**

- Wildlife and humane shelter rabies prevention and control programs
- Improved rabies vaccines for pets and livestock
- Humane, targeted approach to elimination of rabies reservoirs in feral animal populations

### **Competitive Advantages:**

- Safe and effective

- Oral immunization is the most practical and efficient method of rabies

vaccination of wildlife and feral animals

- Vaccine has demonstrated protection in vivo
- Recombinant, non-neuroinvasive virus expressing a neuroinvasive glycoprotein and/or pro-apoptosis gene safely induces a robust and desirable immunological response

**Development Stage:**

- In vitro data available
- In vivo data available (animal)

**Inventors:** Charles E. Rupprecht (CDC), et al.

**Intellectual Property:** HHS Reference No. E-470-2013/0 – US Patent No.

7,074,413 issued 11 Jul 2006

**Licensing Contact:** Whitney Blair, J.D., M.P.H.; 301-435-4937;

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**Cable-line Safety System: Electro/hydraulic Emergency Stop Device for a Winch, Drum or Capstan**

**Description of Technology:** This CDC-developed invention entails a system of electrical and hydraulic circuits used to stop a rotating winch in an emergency. Amongst other locations, one stop switch can be positioned on a capstan winch horn. This location makes it available to a victim entangled in rope being retrieved on a gypsy drum. As designed, the stop circuit could be used with an electrically, hydraulically or pneumatically operated winch. A variant of this safety system has been successfully tested on a purse seining fishing vessel in Alaskan waters.

**Potential Commercial Applications:**

- Retrofitting existing winches for additional safety and adherence to possible future regulations

- Specifically designed and tested for the marine/fishing industries
- Applications in mining, construction, forestry, and/or off-road automotive industries

- Workers' well-being concern groups
- Insurers of fishing vessels; also mining, construction and forestry operations
- Manufacturers of cable reel trailers and wire-drawing machinery

**Competitive Advantages:**

- Complies with numerous international safety regulations requiring winches, drums and capstans to have a master on/off switch in easy reach for worker safety
- Can be packaged as a 'retrofit kit' for integration with current commercial winch/drum usage

**Development Stage:**

- In situ data available (on-site)
- Prototype

**Inventors:** Chelsea Woodward, Todd Ruff, Curtis Clark, Robert McKibbin, John Bevan, Greg Miller, Wayne Howie, Louis Martin, Jennifer Lincoln (all inventors from CDC-NIOSH)

**Intellectual Property:** HHS Reference No. E-355-2013/0 – Research Tool.  
Patent protection is not being pursued for this technology.

**Related Technologies:**

- HHS Reference No. E-504-2013/0
- HHS Reference No. E-567-2013/0
- HHS Reference No. E-568-2013/0
- HHS Reference No. E-643-2013/0

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### **Lead Detection Wipes for Potentially Contaminated Surfaces**

**Description of Technology:** This CDC-developed invention relates to a method for the detection of lead on surfaces (such as, for example, skin, floors, walls, windowsills) using a ‘handwipe’ system and a chemical test effecting a characteristic color change if contaminating lead is present. This invention is especially useful in detecting the presence of lead on skin and assessing the effectiveness of hand washing in removal of lead from the skin of exposed individuals. Further, this invention is useful in field evaluation for the presence of lead, exposure of individuals to lead, and the effectiveness of its subsequent removal in the workplace, home, school, and similar environments.

#### **Potential Commercial Applications:**

- Suitable for lead-testing surfaces such as floors, walls, windowsills and human skin
- Evaluation of lead-removal effectiveness from surfaces in homes, hospitals, workplaces and schools
- Confirming hand/skin/shoe/clothing-washing effectiveness of lead removal for military, target range personnel

**Competitive Advantages:**

- Simple color-change readout indicates the presence of lead on a surface
- Rapid test; lead concentration can be inferred by degree of color shift
- Safe for use on skin

**Development Stage:**

- In vitro data available
- In situ data available (on-site)

**Inventors:** Eric J. Esswein, Mark F. Boeniger, Kevin E. Ashley (all of CDC)

**Publications:**

1. Ashley K. Field-portable methods for monitoring occupational exposures to metals. J Chem Health Saf. 2010;17(3):22-8.

[<http://dx.doi.org/10.1016/j.jchas.2009.07.002>]

2. NIOSH Manual of Analytical Methods (NMAM), Fourth Edition. Method 9105, Issue 1 - Lead in Dust Wipes by Chemical Spot Test Method (Colorimetric Screening Method), 15 March 2003. U.S. National Institute for Occupational Safety and Health (NIOSH), Cincinnati, OH. [<http://www.cdc.gov/niosh/docs/2003-154/pdfs/9105.pdf>]

3. Esswein EJ, et al. Handwipe Method for Removing Lead from Skin. Journal of ASTM International. 2011 May;8(5):Paper ID JAI103527.

[<http://dx.doi.org/10.1520/JAI103527>]

**Intellectual Property:** HHS Reference No. E-336-2013/0 – US Patent No. 6,248,593 issued 19 Jun 2001

**Related Technology:**

- HHS Reference No. E-356-2013/0
- HHS Reference No. E-359-2013/0

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### **Mining Safety: Personal Dust Monitor Filters for Accurate, Quantifiable Spectrometric Analysis and Assessment of Worker Exposure Levels**

**Description of Technology:** This CDC-developed invention pertains to a novel dust monitor filter that is specially constructed of organic materials for spectrometric analysis, ultimately allowing for detection and accurate quantification of a particular chosen analyte (e.g., crystalline silica/quartz dust that may lead to silicosis).

For miners, the risk of lung disease increases with the extent of dust exposure, and coal worker's pneumoconiosis (aka, black lung disease) and silicosis are still dangers routinely faced by those in the industry. Expectedly, both the concentration and the composition of airborne particulate matter present in mining environments are points of regulatory concern. For some time, collecting airborne dust samples and subsequent determination of quartz content have been integral for assessing mine worker exposure and demonstrating compliance with US Federal regulations.

Unfortunately, highly accurate spectrometric detection and quantification of particulate exposure has not always been possible. Generally, the filters used in existing oscillating microbalances (such as the TEOM® monitor) have been specially designed to for hydrophobicity, in order to retain as little moisture as possible on the filter. These specialized hydrophobic filters (and/or their mounting components) contain inorganic

compounds that cannot be readily subjected to thermal or chemical destruction - a necessary first step of many instrumental analytical methods, such as spectroscopy.

This CDC-developed filter consists of entirely ashable material, making it ideal for spectrometric analysis and rapid exposure assessment. As an example, this dust monitor filter can be made entirely of organic materials and designed for quick, easy ashing that will not produce interference with the spectroscopic characteristics of the chosen analyte(s). Further, filter ashing can be carried out by a variety of methods: thermal ashing, microwave ashing, low temperature ashing, or chemical destruction.

**Potential Commercial Applications:**

- Personal dust monitors worn wherever dust exposure levels and the presence of potentially injurious materials is evaluated
- Occupationally-mandated pneumoconiosis, asbestosis and/or silicosis prevention and monitoring programs, for complying with safety regulations
- Miners' wellness concern groups and insurance companies

**Competitive Advantages:**

- Novel dust-monitoring instrument capable of providing near rapid particulate exposure information to miners/users
- Improves upon older technology by allowing for accurate detection and quantification of chosen analyte(s) and, unlike other filters, does not produce overlap or interfere with spectroscopic analysis
- Filter can be easily ashed for analysis by thermal ashing, microwave ashing, low temperature ashing, or chemical destruction

**Development Stage:**



- Early-stage
- In vitro data available

**Publication:** Tuchman DP. Implementing infrared determination of quartz particulates on novel filters for a prototype dust monitor. J Environ Monit. 2008 May;10(5):671-8. [PMID 18449405]

**Intellectual Property:** HHS Reference No. E-312-2013/0 – US Patent No. 7,947,503 issued 24 May 2011

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### **Computer Controlled Aerosol Generator with Multi-Walled Carbon Nanotube Inhalation Testing Capabilities**

**Description of Technology:** This invention pertains to a CDC-NIOSH developed sonic aerosol generator that provides a controllable, stable concentration of particulate aerosol over a long period of time for aerosol exposure studies. Specifically, in situ testing data indicate uniform aerosol stability can be maintainable for greater than 30 hours at concentrations of 15 mg/m<sup>3</sup> or more. Additionally, the technology was specifically developed for, and validated in, animal studies assessing exposure to airborne multi-walled carbon nanotubes (MWCNT). It has been suggested that workers may be at risk for exposure to nanosized particles during the manufacture, handling, and cleanup of engineered nanomaterials. Compared to other technologies, this NIOSH aerosol generator is particularly helpful when used for generating high testing concentrations of

MWCNT aerosols that more accurately represent particulate levels that may be seen in a workplace environment.

**Potential Commercial Applications:**

- Studying the size and shape of the aerosolized particles produced from simple vibrations of bulk material
- Toxicological investigations and risk assessment of aerosol exposures, especially those related to nanoparticle manufacturing.
- Any aerosolization application where the aggregating “bird's nest” tendencies of airborne multi-walled carbon nanotubes must be overcome

**Competitive Advantages:**

- Fully automated system with integrated feedback control for optimized stability in testing
- Maintains concentration of aerosols for >30 hours at concentrations of 15 mg/cubic meter or more
- Capable of generating high concentrations of aerosols that more accurately represent the levels seen in a workplace environment
- System insures that each run produces a constant particle concentration, air flow, pressure, temperature and humidity within a testing chamber

**Development Stage:**

- In vitro data available
- In vivo data available (animal)
- In situ data available (on-site)
- Prototype

**Inventors:** Walter G. McKinney, David G. Frazer, Bean Chen (all of CDC)

**Publications:**

1. McKinney W, et al. Computer controlled multi-walled carbon nanotube inhalation exposure system. *Inhal Toxicol.* 2009 Oct;21(12):1053-61. [PMID 19555230]
2. Porter DW, et al. Acute pulmonary dose-responses to inhaled multi-walled carbon nanotubes. *Nanotoxicology.* 2013 Nov;7:1179-94. [PMID 22881873]
3. Porter DW, et al. Mouse pulmonary dose- and time course-responses induced by exposure to multi-walled carbon nanotubes. *Toxicology.* 2010 Mar 10;269(2-3):136-47. [PMID 19857541]
4. Chen BT, et al. Multi-walled carbon nanotubes: sampling criteria and aerosol characterization. *Inhal Toxicol.* 2012 Oct;24(12):798-820. [PMID 23033994]

**Intellectual Property:** HHS Reference No. E-156-2013/0 – US Patent Application No. 12/871,453 filed 30 Aug 2010

**Licensing Contact:** Whitney Blair, J.D., M.P.H.; 301-435-4937;  
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